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THE RADIOGRAPHY OF THE NORMAL URINARY TRACT OF THE DOG

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In making a study of the topography of the abdomen of the dog we came in due course to consider the urinary tract, and in order to demonstrate these organs to advantage we required to make use of a contrast technique. A search of the literature revealed a number of descriptions of procedures that had been used in the past but in no case was the account entirely satisfactory, either because the technique employed seemed to be unnecessarily complicated or because the results described were not supported by illustrations. We therefore put forward this description of the method we employed in the hope that it may be of interest to those concerned with veterinary radiology.

In human as in veterinary radiology plain radiographs of the urinary organs are of very limited value, except for the detection of opaque calculi, and to obtain a satisfactory demonstration of the state of these organs recourse must be had to contrast techniques. Of these a number are available, and in the human subject two techniques are currently in vogue. In the first a suitable substance is introduced by catheter into the ureter via the bladder under cystoscopic control, and in this way is used to outline the renal calices, pelvis and ureter ; in the second a parenteral injection is made of an agent that will be excreted by the kidneys and concentrated by them, and in this way the lumen of the urinary apparatus is outlined. Although the first or ascending technique has been described by a number of veterinary writers (Henkels, Klarenbeek and Cliza among others) it is on the whole unsuitable for use in veterinary practice and most workers accordingly have preferred the excretory method. Among the most recent papers on the descending technique are those of Vatovec and Lauder & Heney : the first of these describes a technique complicated by the need to raise the pressure within the bladder, while that of Lauder & Heney, direct in its approach, is the one which formed the starting point of our own investigations ; it is, unfortunately, unillustrated. A further method, and one of which we have had no experience, consists of the introduction of air into the peritoneal cavity where by negative contrast it demonstrates the contour and position of the organs. As described by Klarenbeek, this method gives satisfactory results within its limited scope.

ANIMALS AND TECHNIQUE

The 15 animals used in our series were young adult greyhounds of both sexes which were, to our knowledge, free from systemic disease.

To achieve the best results the animals should be prepared for the examination by a preliminary emptying of the colon and rectum by the judicious use of laxatives and enemata. Water should also be withheld for some 6 to 12 hours in order to obtain the maximum concentration of the urine. In our series we omitted to prepare the bowel in this way as we did not wish to disturb the normal topography of the abdomen and the results were not unduly affected.

In some cases the animals were anaesthetised for the examination as this facilitates the procedure, making it easier to immobilise the subject in the one position. The introduction of the contrast agent, however, causes no distress to the dog and we have no experience of the occurrence of the minor disturbances seen in the human subject.

Plain radiographs of the urinary organs were first attempted but, as has been indicated, these are rarely satisfactory and at most give a poor indication of the size and position of the kidneys and bladder : the ureters are, of course, invisible. For the taking of the series we prefer to have the animal restrained in the dorsal position on a Potter-Bucky couch, and we regard the use of a movable or at least of a stationary grid as being highly desirable, if not absolutely essential. If the entire urinary tract is to be examined we find it preferable to make use of large films that will include the kidneys and the bladder on the one plate, for if attention is at first directed to the kidneys and only later to the bladder it may be found that the shadow of this organ is already too opaque to permit the visualisation of the state of the mucosa. There is, however, the disadvantage that no single exposure technique will give a completely satisfactory contrast and definition of both kidneys and bladder.

The contrast agent we employed was diodone in various proprietary preparations, and although this can be administered in a variety of ways we employed only the intravenous route ; in greyhounds weighing approximately 65 lb., 15 c.c. of a 50 per cent. w/v solution were employed and this was injected over half a minute. The pharmacology of this substance has been described on many occasions and, while reference should be made to a recent publication for an account of its actions and its contra-indications, we would point out that its use is contra-indicated in cases of grossly impaired renal function, and for this and other reasons the method of intravenous urography should not be used as a means of assessing the efficiency of the kidneys.

When it is desired to examine the bladder only it is of course sufficient in both sexes merely to catheterise the subject and inject a moderate quantity of a dilute contrast agent into the organ ; for this purpose an 8 per cent. solution of sodium iodide is both cheap and eminently satisfactory.

At the end of these experiments the animals used were prepared for dissection in the usual manner and we were unable to make a thorough *post-mortem* examination of the organs. In the superficial examinations it was possible to make, no alteration of note was observed in any animal. This is a point of some importance since, as will appear later, it was frequently found that one of the kidneys was only poorly visualised while the other presented a dense shadow —a circumstance which might lead to a hasty diagnosis of unilateral renal insufficiency : it should be stressed that this may arise from one kidney being in the resting phase with the cortical blood supply reduced through the opening of the juxta-medullary by-passes, in which case of course the output of urine is reduced.

In our investigations the routine involved the taking of films at 3, 6, 10 and 15 minutes and thereafter as appeared to be necessary. In the investigation of a clinical case we

would suggest that films made at 7 and 20 minutes will generally be sufficient.

The Development of the Shadow

This is subject to much variation between individuals and also in the same individual at different times : the possibility of variation between the two kidney shadows has already been the subject of comment. In most cases the first sign of the appearance of the contrast agent in the kidneys occurs one to two minutes after injection, and by three minutes there may be a good density of shadow in the pelvis. Usually, however, the maximum intensity does not develop until 10 to 15 minutes after injection, but once there it persists for some time. Shortly after the renal pelves are outlined the agent begins to make its way down the ureters to the bladder although some time must elapse before the ureter is filled along its entire length and the bladder begins to be defined. It is well, however, to examine this organ at intervals, since once a considerable quantity of the agent has reached the bladder the mucosal relief may be obscured. There are times when one entirely fails to secure good visualisation of the kidneys and yet the bladder shadow develops rapidly ; this presumably occurs when there is little pressure resisting the escape of the urine from the kidneys and may to some extent be counteracted by the use of a compression band over the viscera in the posterior part of the abdomen.

Radiological Anatomy

The Kidneys.—The kidneys lie in the sublumbar region ventral to the psoas muscles and partially protected by the costal arch. They are, however, subject to more variation in their position than the standard accounts would suggest : for while the right kidney is certainly restricted in its mobility by being received into the renal fossa of the liver, it may vary by the length of a vertebra from its usual position ventral to the last rib and the first two lumbar vertebrae ; the left kidney is not subject to the restriction imposed by the liver and consequently shows far greater variation in position. It may, for example, lie almost level with the right kidney and, while usually overlapping by about an inch, it may even be found a fair distance posterior to the right organ ; in addition, it usually occupies a position that is both more ventral and more lateral than that occupied by the right one.

The position of the kidneys is of course influenced by the respiratory movements and with each excursion of the diaphragm they may move through as much as the length of a vertebra.

When the kidneys are excreting the diodone they may be sufficiently opaque for their contours to be discerned, but as a rule it is only the renal pelves that are accurately portrayed. The pelvis is crescentic in shape and curves towards each pole of the kidney : arising from its greater curvature are buttress-like projections (*processus interpapillares*) which embrace the renal crest and simulate the appearance of calices. These processes are subject to a considerable variation of form, being long and slender in some cases, short and more robust in others, but this difference in shape does not seem to depend on any pathological alteration of the organ. Examined *en face* the renal pelvis is seen to be somewhat thicker in its central part than it is at either end, where the processes project at a more acute angle. The pelvis merges imperceptibly with the free part of the ureter.

The Ureters.—The course of the ureters towards the bladder is irregular. The wide initial portion lies almost transversely and shows only a slightly caudal inclination : this is succeeded by a narrower part that runs obliquely backwards, and after traversing the length of a couple of lumbar vertebrae it takes up a position just medial to the lateral borders of the bodies of the vertebrae. There is a tendency for the left ureter to occupy a more medial position than the right, which may sometimes be found as far laterally as the tips of the transverse processes of the lumbar vertebrae ; both are, however, very inconstant in position. At about the level of the seventh lumbar vertebra the ureters are deflected laterally before turning inward in the lateral folds of the bladder to enter this organ on the dorsal surface close to the neck, and if the wall of the bladder is clearly outlined it is sometimes possible to identify the intravesicular portion of the ducts. Throughout their length the ureters show considerable irregularity in thickness and in direction and when a series of films are compared it will be found that these irregularities are by no means permanent. The changes in direction are often sufficiently abrupt to constitute kinking and several kinks and bends may follow one another in close succession : these deflections are without significance.

The Bladder.—While the neck of the bladder is relatively fixed in position, being commonly found an inch or so posterior to the pecten of the pubis, the remainder of the organ is, of course, subject to very great alteration in size and therefore in position. When moderately distended the bladder is contained between the shafts of the ilia and is in contact with them. At this stage it is usually symmetrical in shape and the anterior border is rounded : when viewed from the side it is seen to be piriform but, surprisingly, the stalk of the "pear" is anterior and on the floor of the abdomen while the rounded part is within the pelvis. In the dog this rounded base is indented in its ventral part where it abuts on the prostate.

As the bladder increases in size it extends forwards beyond the pelvis, spreads out between the other abdominal organs and the floor of the abdomen and when its intrinsic tone is low may assume a very irregular shape, being moulded by the organs with which it comes into contact. This great plasticity of the hypotonic bladder should be constantly borne in mind since failure to take it into account may lead to erroneous interpretations of the indentations of its contours which are usually clearly visible.

When full the bladder frequently assumes an asymmetrical position and may be observed to be deflected to one side, generally towards the right owing to the presence of the descending colon on the left : deflection towards the left is less common. At this stage the anterior part of the bladder is often much narrower than the base which, contained within the pelvis, is relatively free from distorting pressures. In cases of retention of urine the bladder may of course reach gigantic proportions, but this is neither a normal condition nor is it likely to be one that calls for special radiological investigation.

The Urethra.—Since the urethra is for the greater part of its length common to both the urinary and genital tracts it is for a number of reasons more conveniently considered with the genital organs.

The clinician is the best judge of the position which radiology occupies in the diagnosis of affections of the urinary organs and we have no wish to dogmatise on a subject outside our particular field. Our experience with the experimental use of excretory urography suggests that the technique is as simple and as reliable in the dog as it is in man, and that the complicated routines that have been recommended are quite unnecessary. And this being so, it seems possible that urography may have a useful application in small-animal practice.

FIG. 1.—Film taken eight minutes after injection showing unequal density of the kidney shadows.

FIG. 2.—Renal pelvis with slender processes.

FIG. 3.—Renal pelvis with short and stout processes.

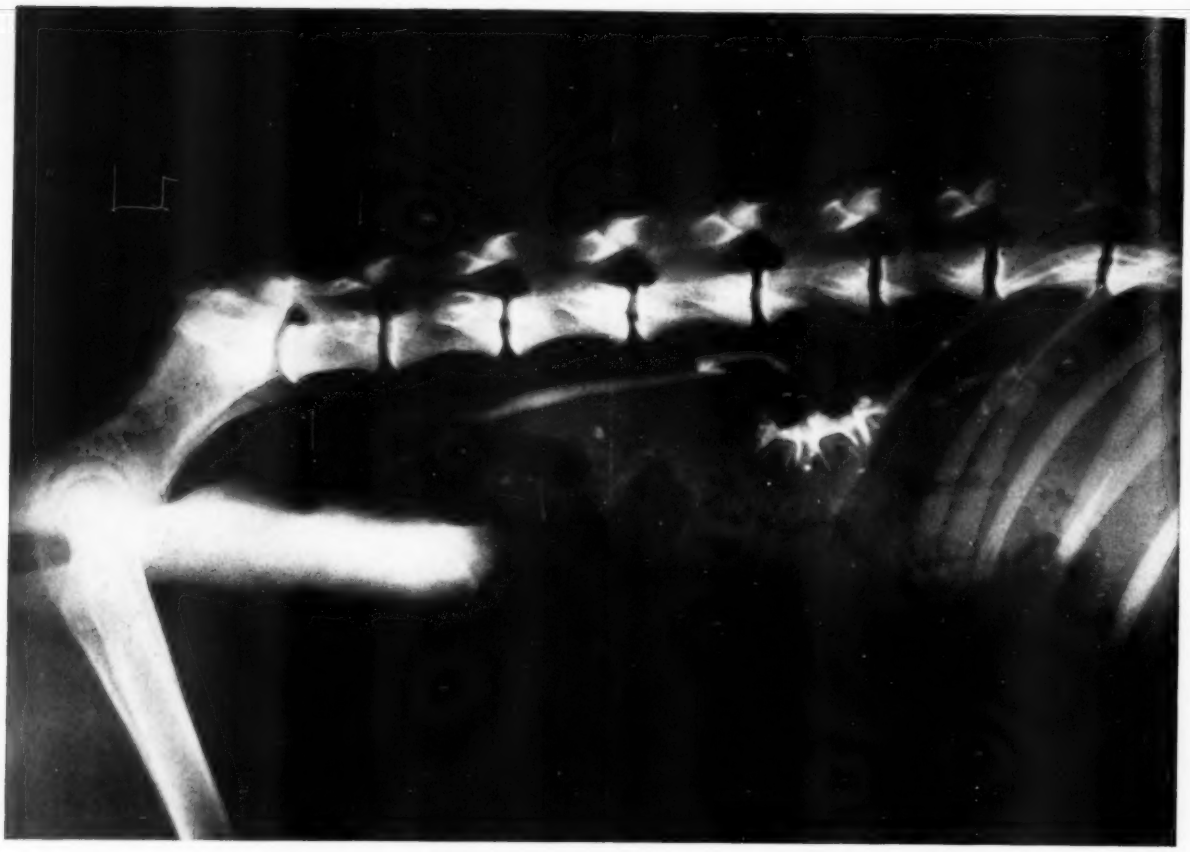

FIG. 4.—Lateral view of urinary tract showing irregular and kinked course of ureters and irregular shape of hypotonic bladder. The right kidney is poorly demonstrated.

FIG. 5.—A moderately distended bladder.

FIG. 6.—Lateral view of a moderately distended bladder.

ISONIAZID: ITS EFFECT ON *MYCOBACTERIUM JOHNEI IN VITRO* AND ITS FAILURE TO CURE CLINICAL JOHNE'S DISEASE IN CATTLE

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Introduction

Isonicotinic acid hydrazide, or "Isoniazid," was first synthesised by Fox in 1951. Preliminary reports indicate that it is one of the most effective agents against the tubercle bacillus which has been found since the discovery in 1946 that some of the thiosemicarbazones possess antituberculous properties. Steenken & Wolinsky (1952) have shown that in guinea-pigs and rabbits infected with fully virulent strains of *Mycobacterium tuberculosis* of both human and bovine type, all those treated with Isoniazid survive whereas all the untreated control animals die. During the past year many enthusiastic reports of the efficiency of the drug in the treatment of tuberculosis in man have appeared in the literature from the United States. In this country the Medical Research Council has issued an interim report (M.R.C., 1952) which, while it admits the beneficial results obtained, is more guarded in its conclusions.

In Britain the known antituberculosis agents have little place in veterinary therapeutics and their use in tuberculous cattle is certainly not to be encouraged, the present policy being eradication of the disease by means of control measures based on the single intradermal comparative tuberculin test. It was felt, however, that as Isoniazid had apparently such a pronounced inhibitory effect on the multiplication of *Mycobact. tuberculosis* both *in vitro* and *in vivo* it might have a similar effect on *Mycobact. johnei*, another member of the acid-fast group. The following is a brief description of some of the work that has been carried out in this connection at Compton and the conclusions which have been reached. The experiments carried out were :—

(1) *In vitro* TESTS

Isoniazid was added to the medium and its effect on growth observed.

(2) *In vivo* TESTS

Isoniazid was administered to (*a*) healthy cattle and estimations of the blood levels were made, and to (*b*) clinical cases of Johne's disease.

Acknowledgment.—We wish to thank Mr. C. A. Fowler for technical assistance.

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Materials and Methods

(1) *In vitro* TESTS

The solid egg medium of Finlayson (1946), to which 4 per cent. glycerine and 1 per cent. heat killed *Mycobact. phlei* had been added before inspissation, was used for the *in vitro tests.*

One gramme of Isoniazid (I.C.I. (Pharmaceuticals), Ltd.) was dissolved in 100 ml. distilled water. This solution was sterilised by filtration through a Seitz filter and the filtrate added to the medium in the proportions necessary to give concentrations of 1, 2, 5 and 10 μg. per ml. The medium was then sloped in 4 ml. quantities in McCartney bottles and inspissated. Five bottles of each concentration were prepared and the drug was omitted from five control bottles.

Four strains of *Mycobact. johnei*, recently isolated from cattle, were examined and the most rapidly growing of these was selected as a test strain. To prepare the inoculum a suspension in Ringer's solution of a six-week-old growth on Finlayson's medium was standardised to an opacity comparable to Brown tube 5. This suspension was diluted 1 : 100 with Ringer and one loopful of this dilution was inoculated on to each slope. The slopes were incubated at 37° C. and observations were made at weekly intervals for 12 weeks.

The above experiment was repeated five times.

(2) *In vivo* TESTS

(*a*) *Blood levels in cattle*

Dosage rates of 3 mg., 6 mg. and 12 mg. per kg. were adopted, the highest level being roughly three times the dose normally employed in the human. Where possible, each dosage rate was tested on three animals, by both the intravenous and oral routes, the dose being given in 200 ml. water.

The animals were bled from the jugular vein at intervals of 3, 6, 9 and 12 hours after dosing. In the case of those dosed intravenously an extra bleeding was carried out 15 minutes after dosing. The blood was allowed to clot and the serum was drawn off as soon as practicable and stored at 4° C. till dispatched for testing, which was usually two days after dosing.

The estimations were carried out at the Weybridge laboratory of the Ministry of Agriculture and Fisheries by Mr. N. Saba, who used his modification of the method described by Kelly & Poet (1952).

(*b*) *Treatment of affected cattle*

Three attested cattle showing clinical evidence of Johne's disease were brought to the isolation compound at this field station for treatment. Diagnosis was confirmed by the complement fixation test (Hole, 1953), demonstration of *Mycobact. johnei* in smears of the faeces, and culture of the organism from faeces samples.

Isoniazid was administered at the rate of 12 mg. per kg. every 12 hours. Dosing was by the oral route.

RESULTS

(1) *In vitro*

Visible growth did not usually appear in the control bottles till the third week of incubation. The results at the third week and the sixth week have been used to illustrate the general picture. They are shown in Table I and Table Ia, from which it will be seen that Isoniazid concentrations in the region of 2 to 5 μg. per ml. were required to inhibit growth. This inhibition was only transient and by the sixth week growth had occurred even in the tubes containing 10 μg. per ml.

Table I

The Effect of Isoniazid on the Growth of *Mycobact. johnei* after Three Weeks' Incubation at 37° C.

μg. per ml.	1st Expt.	2nd Expt.	3rd Expt.	4th Expt.	5th Expt.
0	+	+	+	+	+
1	+	+	0	+	+
2	0	+	0	—	0
5	0	0	0	+	0
10	0	0	0	0	+

Table Ia

The same after Six Weeks' Incubation at 37° C.

μg. per ml.	1st Expt.	2nd Expt.	3rd Expt.	4th Expt.	5th Expt.
0	+	+	+	+	+
1	+	+	+	+	+
2	+	+	+	+	+
5	+	+	+	+	+
10	+	+	+	+	+

Each mark represents five tubes. + = 10 to 100 colonies, 0 = no growth, — = contaminated.

(2) *In vivo*

(*a*) *Blood levels in cattle*

Oral dosing at 3 mg. per kg. and 6 mg. per kg. produced no detectable blood level. At 12 mg. per kg. a maximum level of 4·6 μg. per ml. was observed three hours after dosing. By the 12th hour this level had fallen to less than 1 μg. per ml. The mean levels are recorded in Table II. These levels could be doubled by repeating the dose at 12-hourly intervals for one week prior to sampling (Table III).

Table II

Mean Serum Levels in μg. per ml. after a Single Dose by the Oral Route

Dose	No. of cows	3 hours	6 hours	9 hours	12 hours
3 mg. per kg.	3	0	0	0	0
6 mg. per kg.	3	0	0	0	0
12 mg. per kg.	3	2·6	2·8	1·4	0·8

Table III

Mean Serum Levels in μg. per ml. after dosing by Oral Route every 12 hours for one week

Dose	No. of cows	3 hours	6 hours	9 hours	12 hours
12 mg. per kg.	2	5·4	5	2·9	2·4

Intravenous dosing at the same rates gave higher and more rapidly produced blood levels than oral dosing but they persisted for about the same time and 12 hours after dosing the level had fallen to less than 1 μg. per ml. The mean levels are recorded in Table IV.

Table IV

Mean Serum Levels in μg. per ml. after a Single Dose by the Intravenous Route

Dose	No. of cows	½ hour	3 hours	6 hours	9 hours	12 hours
3 mg. per kg. ...	3	4·9	2·4	1·2	1·6	0·4
6 mg. per kg. ...	2	10·8	4·2	2	1·3	0·5
12 mg. per kg. ...	3	24·9	8·7	4·4	2·2	1·0

(*b*) *Treatment of affected cattle*

The experiments described above had shown that concentrations of Isoniazid of at least 2 μg. per ml. and preferably 5 μg. per ml. were necessary to retard the growth of *Mycobact. johnei in vitro* and that blood levels of this order could be obtained by either the intravenous or oral routes of administration. Because of the probably protracted nature of the course of treatment it was decided that, from a practical point of view, the oral route would be the one of choice. It was therefore decided to treat a number of clinical cases in this manner, the dosage rate being 12 mg. per kg. every 12 hours.

Case No. 1

Subject.—A mature Shorthorn bull. According to the owner, this animal had been in good health and excellent condition two weeks previously. At the time of purchase it showed every sign of Johne's disease and was obviously markedly wasted. The faeces were black, "watery," and foetid and clumps of acid-fast bacilli were demonstrated in smears stained by Ziehl-Neelsen.

Isoniazid was administered every 12 hours at the rate of 12 mg. per kg. dissolved in 200 ml. tap water. Dosing was continued for 21 days by which time the animal was moribund.

Throughout the 21 days the bull lost condition. At no time did the faeces become firmer than "watery." Faeces samples were taken at weekly intervals and *Mycobact. johnei* demonstrated microscopically and recovered culturally. At *post-mortem* examination the bowel showed typical lesions of Johne's disease. Haemorrhages were extensive throughout the intestine. *Mycobact. johnei* was recovered culturally from the ileum, the caecum, and the ileo-caecal and mediastinal lymph nodes. It was not recovered from the liver, kidney, spleen or lung.

Case No. 2

Subject.—A four-year-old Jersey cow. This cow had not been thriving well and faeces examination revealed the presence of *Mycobact. johnei.* The coat was dull and staring, the flanks were hollow, and the faeces thin but could not be described as "watery." Milk yield was 20 lb. per day.

The dosage rate was again 12 mg. per kg. every 12 hours. Dosing was by mouth and was continued for 60 days. Although the cow continued to eat well and maintained her milk yield it was apparent that she was becoming thinner. At no time did her faeces become "watery" but had a paste-like consistency.

Acid-fast bacilli could consistently be demonstrated microscopically in Ziehl-Neelsen stained films prepared from the faeces but sometimes only with considerable difficulty. At the end of the 60-day period the cow died. *Post-mortem* examination revealed extreme emaciation and lesions of Johne's disease throughout the bowel. Corrugations were particularly marked in the ileum and caecum. Haemorrhages

were not prominent being petechial in nature and widely dispersed. *Mycobact. johnei* was recovered culturally from the duodenum, ileum and caecum, and from the submaxillary, popliteal, supramammary, mediastinal, iliac and ileo-caecal lymph nodes, and from the lung. It was not recovered from the spleen, liver or kidney.

Case No. 3

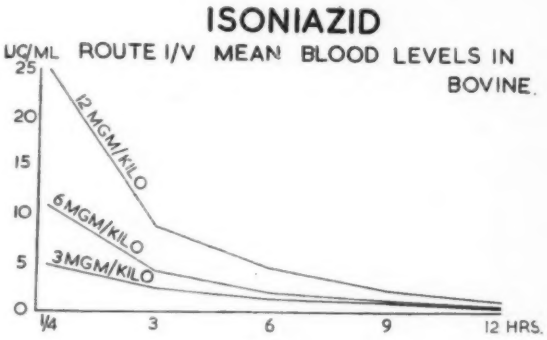
Subject.—A Guernsey cow, aged at least five years. The animal was not in milk and her general condition was very poor. The faeces were "watery" and groups of acid-fast bacilli were demonstrated in smears stained by Ziehl-Neelsen. Isoniazid was administered by mouth at the rate of 12 mg. per kg. every 12 hours and the treatment lasted for 33 days when the cow died. Throughout this period she steadily lost condition although her faeces did become more solid. This firming of the faeces may have been due to eating the oat-straw bedding which, with hay, was all she chose to take. At the *post-mortem* examination emaciation was marked. Thickening of the intestinal mucosa was slight and confined to the ileum. Acid-fast bacilli were demonstrated with difficulty in smears and sections prepared from the ileum. *Mycobact. johnei* was isolated in culture from the duodenum, ileum and caecum; the ileo-caecal, mediastinal and hepatic lymph nodes; and from the liver and lung. It was not recovered from the spleen or kidney, or from the retro-pharyngeal, submaxillary, popliteal or supramammary lymph nodes.

(Since the preparation of this paper a fourth clinical case has died of Johne's disease after similar treatment with Isoniazid for 105 days.)

Discussion

The *in vitro* tests showed some evidence of the power of Isoniazid to delay the growth of *Mycobact. johnei*. As, however, concentrations greater than 1 μg. per ml. were required, Isoniazid cannot be described as "highly active" in this respect. After prolonged incubation growth appeared on all tubes containing drug even up to 10 μg. per ml. which was the highest concentration tested. It is evident, therefore, that, at the most, the action of the drug is bacteriostatic and this would be analogous to its effect on *Mycobact. tuberculosis*. Whether the growth which appears on prolonged incubation consists of colonies of *Mycobact. johnei* which have become adapted to the drug, or whether the growth is due to a diminution in the drug concentration has not been tested. Knox, King & Woodroffe (1952) and Mitchison (1952) have shown that, after incubation at 37° C. for six weeks, only about 5 per cent. of the original concentration of Isoniazid remains in uninoculated Dubos medium, and it is possible that a similar deterioration occurs in solid medium. Bearing this in mind and also the long incubation period necessary for the growth of *Mycobact. johnei*, it will be realised that the effective concentration of drug remaining in the medium at the end of incubation *may* be smaller than that shown in Table I. If this is the case the dose used in the treatment of the clinical cases would give blood concentrations proportionately greater than the level required for inhibition of the organism *in vitro*.

Detectable blood levels can be obtained in the bovine by administering Isoniazid by either the intravenous or the oral route. As would be expected intravenous administration gives quicker and higher levels than oral dosing and smaller doses are required to give detectable levels. According to Saba (1953), the method of assessment is crude, and, although the figures given are comparative, it is doubtful if they represent the total drug content of the samples. It may therefore be assumed that they represent the lowest blood levels at the time of sampling. For ease of comparison the mean blood levels obtained with the three intravenous dosage rates have been plotted together in Graph I. The excretion rate is 50 per cent. each three hours.



Graph 1.

Attempts at treating cases of Johne's disease which had reached the clinical stage were unsuccessful. The animals concerned received Isoniazid for periods of 21 to 60 days and all died of Johne's disease. The cases selected for treatment were all showing clinical symptoms and the pathological changes were presumably well advanced.

Conclusions

Isoniazid is active against *M. johnei in vitro* in concentrations greater than 1 μg. per ml.

This action has the effect of retarding growth.

Blood levels can be produced in the bovine by oral or intravenous administration.

Isoniazid did not cure three clinical cases of Johne's disease when used in the manner described.

Acknowledgments.—I wish to thank Dr. Gordon, Director of the Agricultural Research Council Experimental Field Station at Compton, for helpful advice and criticism during the course of the work; Mr. N. Saba, who carried out the biochemical estimations; and my technician, Miss Shurey, for her valuable assistance.

I should also like to thank Dr. Scott, Imperial Chemical (Pharmaceuticals), Ltd., Manchester, through whom supplies of Isoniazid were made available.

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Weekly Wisdom

There are people who are "too wise, too clever" in their own conceits, to belong to any organisation; but no man can cut himself off in this way, and the outward show of doing so is merely an inward evasion of responsibilities which ought to be accepted.—Horace B. Pointing in *The Wayfarer.*

CLINICAL COMMUNICATION

INFECTIOUS INFERTILITY IN THE BOVINE

A NEW METHOD OF TREATMENT

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During a visit to the Continent recently, it was interesting to discuss with veterinary surgeons their various methods of treating infertility in the bovine. Brucellosis is evidently one of the chief causes and in the past there has been little that could be done to prevent or cure this condition.

It must be added that Brucella infection does appear to be considerably more virulent on the Continent, causing a marked reduction in milk yield and general loss of condition. As was the case in this country some years ago, vibriosis and nutritional infertility are considered to be minor troubles compared with Brucellosis.

Continental practitioners are obtaining interesting results in the treatment of infertility with a substance called "Parabortine," which consists of nitrobenzalacetone thiosemicarbazone combined with bromhydroquinone and hydroquinone in a starch base. This product is put up in the form of a pessary, which is said to possess the power of attacking local infections in the vagina and uterus, as well as being rapidly absorbed into the blood stream. It is also claimed that it can penetrate fat, and so is able to reach infections in lymphatic glands. Favourable reports on this product have been made by several well-known workers—including Professor Berthelon, of the National Veterinary College, Toulouse—and it is being utilised in large quantities in Belgium, France and Luxembourg.

With these facts in mind, trials with this substance have been carried out in my practice. A description of the results and method of treatment may be of interest to veterinary surgeons who, no doubt, have similar problem herds.

In sporadic cases of infertility, one pessary was introduced into the uterus or vagina on five consecutive days. I inserted the first pessary, and the other four were introduced by the farmer with an instrument provided with the pessaries. The use of this instrument was important as it could readily be used by the farmer, and rendered unnecessary uneconomical daily visits by the veterinary surgeon. As a result of manual insertion of a pessary into the vagina there is some danger of straining and expulsion of the pessary. When the instrument is used, this does not happen.

In the first two herds treated, practically all the cattle had been vaccinated with Strain 19 on more than one occasion. It was decided to treat all the cows at the same time, except those just due to calve and those that had been served recently.

The first herd was on a small farm milking 12 cows. All the cattle had been vaccinated previously with Strain 19, but abortions continued to occur, and considerable infertility resulted. Of three relatively young cows, all of which aborted in September and October, 1951, one had previously aborted in June, 1949, and was then revaccinated. After repeated services she eventually held, but in September, 1951, she aborted a foetus which, on laboratory examination, was positive for *Brucella abortus*. This cow was treated with "Parabortine" in October, 1951, by the method described. The next oestral period was missed, and she was then served successfully and calved normally for the first time in her life in September, 1952. It was perhaps significant that the cleansing came away perfectly normally. The other two cows followed much the same pattern, but required two services before they held.

Although the other nine cows in the herd had calved quite normally, they had required numerous services and uterine irrigation. Subsequently, after treatment with one "Parabortine" pessary daily for five days, eight of the cows held to the first service. The remaining cow had suffered excessive damage to the uterus at the previous calving when she had produced twins. This cow was sold fat and not in calf.

In the following year six of these eight cows calved, and cleansed normally. Of the remaining two, one, a poor milker, was sold in calf, and her further history is unknown. The other aborted at eight months, and the foetus was negative for *Br. abortus*. Immediately after aborting, this cow developed severe diarrhoea which was positive for *M. johnei* and she was slaughtered.

The second herd was a pedigree attested Guernsey herd. Previous to the use of "Parabortine," nine cows out of 28 aborted in one year, and of these aborts, eight were examined in the laboratory and found to be positive for *Br. abortus*. Since using "Parabortine" in late 1951 and early 1952, there have been only three abortions, although 14 heifers were added to the herd. What is more important is that none of the heifers that had been running with the cows has aborted, suggesting that the spread of infection has been prevented. Of the three cows that aborted, unfortunately the foetus from one was not examined. The foetuses from the other two cows proved negative for *Br. abortus*, and the cows are now in calf again. It will be seen that in this herd only one abortion that could be attributed to *Br. abortus* took place in 1952, as compared with eight in the previous year, all of which were due to *Br. abortus*.

Discussion

From the cases described it appears that "Parabortine" pessaries have some therapeutic value. In no case was there any sign of irritation of the vagina, and the cow did not show any discomfort. In several cases where the cow retained her cleansing, the insertion of one pessary appeared to facilitate its removal and also to prevent the spread of any residual infection. In the two herds described, Strain 19 had been in general use, but abortions due to Brucellosis were still occurring. However, it is not, in any way, suggested that Strain 19 is not successful in controlling Brucellosis in a large number of cases. It is suggested that when infertility does exist through infectious diseases, this method of treatment may well be tried. One of the most outstanding results was that none of the heifers in herd number two aborted in the year following treatment.

Conclusions

A method of combating infectious infertility is described in two herds, and the results appear to be very similar to those that have been obtained on the Continent.

RABIES IN DENMARK

During the winter 1950-51, rabies was reported for the first time during recent years in the Holsten, near the German Eastern frontier. Since then the disease has been spreading slowly to the north in the direction of the Danish frontier. A few weeks ago a case of rabies was reported in a marten, 7 kilometres south of the Danish border. The immunisation of dogs was put into practice in an area of 25 to 30 kilometres along the frontier. Simultaneously, the destruction of foxes, which has already been commenced in this zone, is being continued.—Dr. W. Nielsen, Director of Veterinary Services, Denmark.

ABSTRACTS

Control of Bleeding in Racehorses*

Haemorrhage, chiefly epistaxis, had become a serious problem at one racecourse in America until "Koagmin," a proprietary aqueous solution of oxalic and malonic acids, was tried in a dosage of 10 c.c. intramuscularly 24 hours and another 10 c.c. intravenously two hours before racing. Seventy-one cases are said to have been treated, all successfully, at one track. Eight cases are described, most of which had repeated treatments before races and performed well each time without bleeding.

The mode of action is not established but it is thought to facilitate the mobilisation of thrombin.

The same drug has apparently been used in human and small-animal practice for pre-operative conditioning and in the treatment of *post-partum* haemorrhage, haematemesis, gastric and duodenal ulcers, epistaxis, wounds and even haemophilia.

A use of especial veterinary interest is in the treatment of dogs poisoned by warfarin which causes multiple internal haemorrhages.

J. A. L.

* **Bleeding in Racehorses—A New Way to Control It.** Scott, M. L. (1953). *Vet. Med.* **48.** 95–97.

* * * * *

Life History of *F. gigantica* (Cobbold, 1856)*

During a field survey, initiated by the FAO, dealing with liver fluke control in Pakistan, two egg-masses from snails collected near Rawalpindi were sent by air to the Veterinary Laboratory, Weybridge, for experimental work. Snails from these egg-masses were exposed to infection with miracidia of *Fasciola gigantica*, also of Pakistan origin, and development of the fluke proceeded at laboratory temperatures, mature cercariae emerging 78 days after infection. A lamb, 15 weeks old, was given 200 cercariae over a period of nine days and 110 days later eggs of *F. gigantica* were recovered from its faeces. The fluke took an identical period of time to develop in a calf. By comparison, *F. hepatica* requires an average of 70 days to develop in sheep and calves. The snail concerned was identified as *Lymnaea rufescens*, which shows great variation in shell morphology and occurs widely throughout East and West Pakistan, where field observations suggest it to be the principal vector of *F. gigantica*. Although this snail is often found as a true aquatic in large bodies of permanent water it readily accommodated itself to a restricted habitat at Weybridge and was successfully cultivated by using a technique somewhat similar to that for breeding *L. truncatula*.

J. N. O.

* **Life History of *Fasciola gigantica* (Cobbold, 1856).** Kendall, S. B., & Parfitt, J. W. (1953). *Nature.* **171.** 1164–1165.

THE FARRIERS' COMPANY

At a quarterly court of the Farriers' Company Professor J. B. Buxton was installed as Master for 1953-54, with Mr. Deputy S. R. Walker, Mr. Leslie Prince and Mr. John Stroud as Wardens. Brigadier J. G. Smyth, V.C., M.P., Air Chief Marshal Sir Leslie Hollinghurst and Mr. Frank Lord were elected to the court.

Education in Tropical Veterinary Medicine

A REPORT

BY

Professor A. ROBERTSON,

Royal (Dick) School of Veterinary Studies, University of Edinburgh

The need for a course of post-graduate instruction in Tropical Veterinary Medicine has been recognised as a matter of considerable importance for over a quarter of a century, and recently various official bodies, such as the Royal College of Veterinary Surgeons and the Food and Agriculture Organisation of the United Nations, have begun to take an active interest in the problem. It became obvious during the discussion on this subject at an informal meeting in Stockholm between representatives of the R.C.V.S. and a few of the colonial veterinary officers attending the International Congress, that many there present did not appreciate the part Edinburgh University had played in the past and planned to play in the future in this matter. An historical review of the subject and an outline of the present position may therefore be not only of interest to the profession at large but possibly of some help to the various bodies considering this problem.

In 1929 a Government committee, under the chairmanship of Lord Lovat, recommended the establishment in Great Britain of a School of Tropical Veterinary Science to provide a post-graduate course for all newly-appointed colonial veterinary officers and also refresher courses for veterinary officers on leave in this country (Cmd. 3261). No official action was taken on this recommendation but in 1930 the University of Edinburgh, in co-operation with the Royal (Dick) Veterinary College, instituted a course leading to a University Diploma in Tropical Veterinary Medicine with a syllabus based largely on the recommendations of the Lovat Committee but utilising where possible existing university courses for the Diploma in Tropical Medicine and college courses for the Diploma in Veterinary State Medicine. As a result of the first year's experience this dovetailing of classes was largely abandoned and the course was revised and considerably enlarged on lines suggested by the Adviser in Animal Health to the Colonial Office. A grant of £1,000 per annum was made from the Colonial Development Fund for three years to enable the new syllabus to be put into effect. The course was arranged in two parts, which could if necessary be taken during separate leaves, and was attended mainly by veterinary officers who had already gained some tropical experience. The Colonial Office gave official approval to the course and recommended that it be allowed to rank for study leave and a number of colonial governments provided assistance towards the payment of fees. The unexpended portion of the original grant was utilised to carry on the course during 1935 when a further sum of £750 per annum was provided by the Colonial Development Advisory Committee for four years on condition that the College appointed to its teaching staff an Epizootiologist with colonial experience. This was followed by a considerable improvement in attendance at the course which was continued until the beginning of the recent war when it was suspended and the services of the Epizootiologist dispensed with as no candidates were forthcoming, home leave to colonial veterinary officers having been suspended for the duration.

In 1932 the Royal College of Veterinary Surgeons sought

and obtained powers to examine suitable candidates with a view to granting a Diploma in Tropical Veterinary Medicine and Hygiene (By-laws 117–127). No diplomas have ever been granted under these by-laws though, doubtless, those taking the Edinburgh course would have been eligible to apply for the examination had they so desired.

After the cessation of hostilities two major developments took place in the colonial veterinary field which seemed to have a bearing on the question of the recommencement of the D.T.V.M. course, viz., the establishment in Kenya of a central veterinary research organisation for East Africa (E.A.V.R.O.) and the institution of courses of veterinary education in various territories. The East African Veterinary Research Organisation, which may eventually have its counterpart in West Africa, was at first linked with the Kenya Veterinary Department but now has its own premises and organisation, mainly in that colony. It is being staffed with veterinary and other experts who will carry out investigations into the main animal health problems common to the East African territories, but it has been suggested that it might also be used to some extent for the training of newly-appointed veterinary officers.

Following the Asquith Commission's Report in 1945 (Cmd. 6647) there was created an Inter-University Council for Higher Education in the Colonies to promote the advance of colonial colleges to university status. This council is concerned with a number of institutions of which three, viz., The Gordon Memorial College, Khartoum, Makerere College, Kampala, Uganda, and University College, Ibadan, Nigeria, have instituted courses in veterinary education for local students leading in each case to a diploma of the college concerned. It is presumably the ultimate aim to raise these courses to such a standard that the qualifications will be regarded as registrable by the Royal College of Veterinary Surgeons. These schools also, though not as yet completely developed, provide a source of information on local conditions which could be of considerable value to veterinary officers taking up appointments in the colonies.

Repeated requests from abroad for information about the future of the D.T.V.M. course led the Board of Governors of the Royal (Dick) Veterinary College, in conjunction with the University of Edinburgh, to appoint after the war a small committee to consider the desirability of restarting courses of study for the diploma in Edinburgh. This committee, after consultation with the Adviser in Animal Health to the Colonial Office, decided to recommend to the University that the course be re-introduced and that the opportunity be taken to revise the regulations, if necessary, to meet post-war requirements. In order that in any revision of the curriculum the committee should have the benefit of the experience of those most concerned, it recommended also that a delegate be sent on a short tour of the larger colonies to interview the Directors of Veterinary Services and their staffs, to see something of their work and to ascertain their views on the type of course required. This project having been approved by the Edinburgh University, visits were paid by the writer in the summer of 1951 to the main African colonies and dependencies and discussions were held with the Directors of Veterinary Services and various members of their staffs in the following territories: Sudan, Uganda, Kenya, Tanganyika, Northern and Southern Rhodesia, Nigeria and the Gold Coast. The opportunity was taken of discussing problems of post-graduate veterinary education with the Principals of the University Colleges at Khartoum, Makerere and Ibadan and with the heads of their veterinary schools. Valuable information was also obtained from the Director of the East African Veterinary Research Organisation and from the South African Director of Veterinary Services and his staff at Onderstepoort, Pretoria. The main conclusions reached from these discussions can be summarised as follows :—

1. Need for a D.T.V.M. Course

There is definitely a widespread demand throughout the colonies and other African territories visited for a course of post-graduate study in tropical veterinary medicine, and, provided a suitable course were arranged, it would undoubtedly have the unanimous support of all the Directors of Veterinary Services consulted. The majority of other colonial services—administrative, medical, agricultural, forestry, etc., already have facilities of this nature and it is generally felt that the time is more than ripe for the veterinary staffs to be put on a similar footing.

It is obvious, moreover, from the many communications received from India, Ceylon and other countries in the Middle and Far East, that this desire for suitable post-graduate education is widely shared. Unless this need is met, and met soon, such countries will tend to turn more and more to either the U.S.A. or the U.S.S.R., neither of which alternatives can be looked on as satisfactory from the Commonwealth point of view. A course in this country could not only become a useful clearing house for information on tropical veterinary matters but also make a valuable contribution to cohesion in at least the veterinary aspects of colonial and Commonwealth affairs.

2. Nature of the Course

There was general agreement that the course should be designed mainly for field officers, who form by far the largest proportion of the veterinary services, and whose needs for such post-graduate training and revision are usually greatest. The varied requirements of individual research workers could best be met it was thought by working at an institute or college already specialising in the particular field with which the worker was most concerned. Thus those interested in animal nutrition might go to Aberdeen, those in animal breeding to Edinburgh, those in Parasitology to Liverpool or Weybridge, etc.

We in Edinburgh endorse this view that the best post-graduate training for doing research is doing research. We are well aware, also, that no one institute can ever hope to meet satisfactorily the varied requirements of all veterinary research workers from abroad, and we think it would be both foolish and wasteful to try to do so in view of the many specialised institutes already available in this country. Thus, though the specialist staff we intend to appoint will naturally develop their own lines of research which will eventually, we hope, attract workers from abroad interested in those aspects, we do not propose to make this the main purpose of our course and have devised a curriculum suited largely to the needs of field officers with no special research interests.

Considerable difference of opinion was expressed as to the stage of his career at which an officer should take the course. The majority of people emphasised that the course should, as formerly, be designed for the veterinary officer home on leave after having done one or more tours of duty, on the grounds that the maximum benefit would be obtained from any such course after an officer had obtained some field experience. In one or two cases it was felt equally strongly that the main aim of such a course should be to provide training for the newly-appointed veterinary officer before he proceeded abroad, whilst others expressed a preference for a compromise arrangement in which the first part of the course would be taken immediately on appointment and the remainder after the officer had obtained some tropical experience. It is

obvious that the decision as to the stage of his career at which an officer should take the course must rest largely, if not entirely, with the individual government concerned, in the light of advice given by the Director of Veterinary Services, and that this advice will be influenced by a number of factors —staffing position, leave arrangements, etc. In the revision of the curriculum which has been undertaken, therefore, such a variation in requirements has been borne in mind.

3. Location of the Course

A small number of the people consulted expressed the opinion that the best place for the course would be either at Kabete in Kenya, Vom in Nigeria or Onderstepoort in South Africa, as at all these places certain educational and research facilities already exist, while each is in a position to provide clinical material which is not available in the United Kingdom. Clinical instruction, however, was not generally regarded as an essential constituent of the course nor were research facilities felt to be of much significance for the majority of potential applicants. There was also considerable criticism of the above view, partly on the grounds that courses at such places might tend to be too " parochial " in outlook, tending to over-emphasise local conditions and local policies and partly because many officers felt that it would be easier to settle to post-graduate study at home than in another colony. Be that as it may, it is obvious from discussions at all three places mentioned, that in view both of staffing and of political difficulties, no such course is likely to materialise for some considerable time to come if indeed at all. In the absence of such provision, a course at a home university would receive unanimous support and a large proportion of veterinary officers would definitely prefer it.

There were also occasional discussions on the relative merits of Edinburgh and Liverpool Universities as a location for the course. The latter suggestion had apparently been put forward by Professor J. G. Wright when visiting certain colonies as a member of the Inter-University Council mentioned above, the argument in its favour being the benefits that would accrue to the course from close association with an Institute of Tropical Medicine, an attribute which, of course, applies equally to London. The general reaction to this view was that the benefits claimed for such an association in a course intended mainly for field officers were largely theoretical. Methods for controlling and preventing animal diseases in the tropics are, on the whole, very different from those applicable in the human field so that the extent to which human and animal disease problems overlap is very limited. There was undoubtedly a considerable preponderance of opinion that the Edinburgh Veterinary School, in view of its past activities and experience in this field, should again take the lead in the matter.

Association of teaching with active investigation of tropical diseases is, of course, attractive, but one must remember that research into exotic diseases of animals in this country must always be very restricted for obvious practical reasons. In the fields where some overlap between human and animal tropical disease occurs, viz., vector control and the chemotherapy of protozoal infections, some fundamental research is doubtless possible in this country, in the course of which collaboration with workers in allied fields is desirable, but it must again be emphasised that these constitute only a small part of the field which a D.T.V.M. course must cover and it certainly does not warrant the development of a special institute for this particular purpose nor even necessitate close linkage with an existing Institute of Tropical Medicine. Moreover, it must be remembered that the course will be mainly attended by field officers whose chief objective, so far as animal diseases are concerned, is to learn about and discuss control measures developed and used in various parts of the world with a view to considering their application to their own particular problems. The main value of this part would be as a centre where people from different parts of the world could meet and discuss veterinary problems under the guidance of teachers themselves experienced in dealing with tropical animal diseases. The value will be largely dependent on the appointment of specialist personnel which in turn hinges on the provision of adequate funds, thus putting all universities on an equal footing.

It must be remembered, however, that a very important part of veterinary work in tropical countries nowadays is concerned with the so-called animal husbandry group of subjects—animal breeding, animal nutrition and animal industries including meat and milk hygiene. Here, we in Edinburgh have the advantage over Liverpool and London of close association with a thriving School of Agriculture as well as with a Genetics Department which has made a close study of animal breeding problems in the tropics. Moreover, we have also the unique advantage of collaboration on the spot with bodies such as the Animal Diseases Research Association, the Animal Breeding Research Organisation, the Ministry of Agriculture and Fisheries Poultry Laboratory, the Agricultural Research Council's Poultry Research Centre and the Edinburgh Centre of Rural Economy which comprises an extensive teaching and research project covering all phases of plant and livestock economy. Thus important animal health and animal industry aspects of colonial veterinary activities can be tackled in a way impossible elsewhere and we cannot accept the view that association with an Institute of Tropical Medicine would outweigh these advantages.

4. Length of Course

While the majority of people consulted expressed no objection to a two-term course, it was felt in one or two territories that this was definitely too long and that a shorter course lasting only three to four months would be much more suitable. As against that, others urged extension to three terms to allow of visits being paid to farms, industrial plants and research institutes, in addition to the systematic training. It appeared, however, that a two-term course with the possibility of exemption from part in the case of suitably qualified candidates would meet with fairly general support, and this has been accepted by Edinburgh University as a reasonable compromise.

5. Organisation of the Course

Views as to the guiding principles to be kept in mind in designing the course were to a certain extent conditioned by views as to the stage of his career at which an officer should take it. It appeared to be the wish of the majority that the first part should consist largely of a systematic review of tropical aspects of the various fundamental sciences—Pathology, Bacteriology, Parasitology, etc., dealt with more thoroughly than is possible in an undergraduate course and as far as possible from the practical aspect with emphasis on diagnosis and the submission of material for laboratory examination, while the second part should be more of an applied nature dealing mainly with epidemiological and animal industry aspects of tropical veterinary work and laying stress on recent advances. The view was also expressed quite frequently that in this second part at any rate formal lecturing should be reduced to a minimum and the course run as far as possible on an organised discussion basis.

6. Curriculum

There was general agreement that the previous curriculum for our D.T.V.M. course had been reasonably satisfactory,

though some change of emphasis and some minor deletions and additions were desirable. Thus the relatively small part played by bacterial diseases in the animal health problems of many colonies and the emphasis being placed on the development of animal industries were stressed as factors which should be taken into consideration in the allocation of time in any new curriculum. This has been kept in mind and some rearrangement of subjects has also been found desirable in the light of the views summarised in (5) above. Various additions such as instruction in the pathology of tropical diseases, toxicology and deficiency diseases have also been made. Many people expressed a wish to have included somewhere in the course lectures on colonial history, policy and administration, and also instruction in such subjects as soil erosion, forest preservation, game control, etc., which impinge markedly on the work of the veterinarian in the colonies. Time has, therefore, been allowed in the new course for special lectures on such subjects as well as for talks by colonial veterinary officers on leave in this country.

7. Entrance to the Course

Some discussion took place at various centres on the regulation limiting the former course to candidates who held an approved veterinary qualification registrable by the Royal College of Veterinary Surgeons. In particular the teachers at Khartoum and Kabete Veterinary Schools were anxious that the course should be made available to approved African veterinary officers holding the diplomas of their respective colleges and the political desirability of such an arrangement was supported by some of the Directors of Veterinary Services. On the other hand, the view was strongly expressed by many veterinary officers that no relaxation of the present limitations should be granted and that candidates such as those mentioned above should have to obtain the M.R.C.V.S. or an equivalent registrable degree before being accepted. It is obvious that this point will also arise in relation to Indian and other applicants and the University ultimately decided that the course should be open to candidates with suitable veterinary qualifications even where these are not regarded as registrable by the R.C.V.S. The revised regulations, therefore, state that candidates for the diploma must be graduates in Veterinary Medicine and Surgery of the University of Edinburgh or hold corresponding degrees or qualifications registrable with the Royal College of Veterinary Surgeons or of such other universities or veterinary schools as are recognised for the purpose by the University Court.

8. Co-operation with the Colonial Office

While there was no doubt from the discussions that the various Directors of Veterinary Services consulted would co-operate in allowing staff to attend so far as circumstances permitted, the support and co-operation of the Colonial Office was also obviously an essential prerequisite to the success of the course. It was with gratification, therefore, that the University received from the Colonial Secretary an assurance that, should it be found possible to set up a new course on the lines suggested, he would be glad to bring it to the notice of the appropriate Governments and to encourage them to take as full advantage of it as possible.

The time and expenditure involved in attending the course will be considerable and, particularly where an officer has to take both halves concurrently, some arrangements for extension of leave and for expenses allowance will be necessary. The question of income tax deductions also arises where an officer stays more than six months in Great Britain and it would be imperative to have some agreement in this direction also. In this connection it is interesting to note the special arrangements made for colonial officers attending the Second Devonshire Course at London, Oxford or Cambridge: it would obviously be of exceptional assistance to the success of any D.T.V.M. course if the precedents established in that case could also be applied in the veterinary field. The possibility of some material stimulus such as the granting of an extra increment of salary for the possession of a D.T.V.M. is also worth exploring.

9. Courses for Newly-appointed Officers

In the case of officers appointed to the Colonial Veterinary Service, it would often be out of the question to keep them waiting in Britain till the spring term when the first half of the proposed D.T.V.M. course would start; and, of course, some of the colonies are against leaving their officers any length of time at home before taking up appointment. It has been suggested, therefore, that when the D.T.V.M. course is re-established, short courses of, say, two to four weeks' duration might also be run for newly-appointed officers who for any reason are unable to take any part of the Diploma Course before proceeding abroad. Such a course could be instituted at any time provided suitable teaching staff were available and its introduction may well precede the organisation of the full D.T.V.M. course.

The revised curriculum drawn up by the Faculty of Medicine on the lines indicated above was circulated towards the end of 1951 to the Directors of Veterinary Services in the colonies and various minor modifications which they suggested were incorporated. The final regulations were then adopted by the Senatus and the recommencement of the course was approved by the University Court early in 1952, subject to the necessary financial support being forthcoming. A direct approach to the Colonial Office at this point met with the expected reply that while the proposals were welcomed it had no funds which could be drawn on to finance the course. Application was then made to the University Grants Committee for a supplementary grant to enable the University to get the course started in this quinquennium. Over a year has elapsed since then but so far that committee has apparently been unable to come to any decision on the request.

The amount of money involved is relatively small—less than £10,000 would get the course started and keep it running for the remaining three years of the present quinquennium—so it is obvious that the difficulty cannot be purely financial. Rumour has it that the delay has been at least contributed to by the knowledge that the Royal College of Veterinary Surgeons was also considering this problem and by a suggestion that another University is now interesting itself in the teaching of tropical veterinary medicine; for it is generally believed that the number of students likely to attend would not be sufficient to warrant the establishment of a course at more than one centre, and the University Grants Committee may well have difficulty in assessing the relative merits of conflicting claims. I am sure, however, that neither the Royal College nor any University Veterinary School would willingly delay the start of a course which is so urgently required and for which Edinburgh University's plans are so far advanced. It is to be hoped, therefore, that this outline of the nature and extent of our arrangements may clarify the situation and lead to outside support for our intention to recommence our Diploma Course at an early date. On such a vital matter there is surely no room for dissension. Division in our ranks may indeed result not just in the failure of our particular project but in hindering our profession from making the vital contribution which we know it can make to the economic and social problems of the large under-developed areas of the world.

NOTES AND NEWS

Diary of Events

Oct. 14th.—Meetings of the Editorial Committee, B.V.A.: Main Committee 2 p.m.; Executive 2.30 p.m.

Oct. 14th.—Meeting of the South-East Midlands Division, B.V.A., at the Laboratories of the Animal Health Trust, Newmarket.

Oct. 15th.—Joint Meeting of the Sussex Division, B.V.A., and the Brighton Division, B.M.A., at Brighton (Hotel Metropole), 8.30 p.m.

Oct. 15th.—Meeting of the Herts and Beds Division, B.V.A., at St. Albans (70, Holywell Hill), 7.30 p.m.

Oct. 16th.—Meeting of the Mid-West Division, B.V.A., at Clifton (The Berkeley Café), 2.15 p.m.

Oct. 17th.—Meeting of the Biochemical Society in the Department of Chemical Pathology, Westminster Hospital Medical School, Horseferry Road, London, 11 a.m.

Oct. 20th.—Annual Dance of the Mid-West Veterinary Association, at the Grand Hotel, Bristol.

Oct. 21st.—General Meeting of the South-Eastern Veterinary Association, B.V.A., at the Royal Star Hotel, Maidstone, 2.30 p.m.

Oct. 21st.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, at 1, Wimpole Street, W.1, 5 p.m.

Oct. 22nd.—Meeting of the East Midlands Division, B.V.A., at Thurgarton, 2.15 p.m.

Oct. 23rd.—Meeting of the Sussex Division, B.V.A., at Brighton (Old Ship Hotel), 2.30 p.m.

Oct. 23rd.—South Wales Division, B.V.A., Dinner-Dance at Porthcawl (Seabank Hotel), 7.45 for 8.30 p.m.

Oct. 31st.—Meeting of the Society of Women Veterinary Surgeons, in the Veterinary Hospital, Pembroke Gardens, Liverpool, 2.30 p.m.

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PERSONAL

Retirement of Professor T. G. Browne

PROFESSOR J. A. NICHOLSON BECOMES PRINCIPAL OF THE VETERINARY COLLEGE OF IRELAND

Professor Thomas George Browne, M.SC., M.V.SC., M.R.C.V.S., Principal and Professor of Anatomy in the Veterinary College of Ireland, Dublin, has retired, as from September 30th, 1953, having reached the Civil Service age limit. He will be succeeded as Principal by Professor J. A. Nicholson, M.A., PH.D., M.R.C.V.S., who will continue to be Professor of Physiology, Biochemistry and Histology.

On September 1st last Professor Browne completed 40 years' service on the staff of the Dublin College, and all his colleagues, whether fellow teachers or other members of the profession who have had contact with him, will wish him a long and happy life in retirement from a post which he has held with much distinction and great benefit to the institution he has served so faithfully.

Immediately after qualifying at Dublin in 1913, after a brilliant scholastic career, T. G. Browne was appointed Demonstrator in Pathology and Anatomy, also Research Assistant to the late Professor Mettam, then Principal. In 1915 he was promoted to the Chair of Anatomy, a position created a few years previously as a consequence of the transfer of Professor George H. Wooldridge to the London College.

Appointments.—Mr. F. R. Spratling, M.R.C.V.S., has been appointed to a Lectureship in the Department of Clinical Studies in the University of Cambridge School of Veterinary Medicine.

The Colonial Office announces the following appointments: Of Mr. W. G. Barnard, Principal Veterinary Officer, Swaziland, as Deputy Director of Veterinary Services, Tanganyika, and of Mr. E. C. S. Dawe, Deputy Director of Veterinary Services, Tanganyika, as Director of Veterinary Services, Tanganyika.

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Marriages.—ANGUS—PEARS.—On September 26th, 1953, at All Saints' Church, Culgaith, Cumberland, Captain Colin Ewart Angus, M.R.C.V.S., youngest son of Mr. and Mrs. J. Angus, 109, Balerno Drive, Glasgow, S.W.2, to Jean Valentine Pears, only daughter of Mr. and Mrs. J. G. Pears, Hazel Dene, Culgaith, Penrith, Cumberland.

JONES—PEARCE.—On September 19th, 1953, at St. Mary's Parish Church, Hendon, London, N.W.4, Bruce V. Jones, M.R.C.V.S., only son of Mr. and Mrs. P. Brian Jones, of Aylesbury, to Shirley N. Pearce, daughter of Mr. and Mrs. Leonard Pearce, of Durban and Mill Hill.

LEMON—KIPLING.—On October 3rd, 1953, at The Priory Church, Christchurch, Hampshire, by the Rev. Cooke, Donald Alfred Lemon, M.R.C.V.S., only son of Mrs. Lemon and the late Mr. A. Lemon, 96, High Street, Hadleigh, Suffolk, to Vivien Eugenie Kipling, B.E.M., youngest daughter of Mr. and Mrs. J. C. Kipling, 18, Somerford Way, Christchurch, Hampshire.

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R.C.V.S. OBITUARY

The Late Mr. Arthur H. Watson, M.R.C.V.S.

AN APPRECIATION

Mr. A. J. ADAMS, B.SC., M.R.C.V.S., of Thornbury, Bradford, writes: "Your readers will have learned with deep regret, from the announcement made in the issue of *The Veterinary Record* of September 26th, of the death of Mr. Arthur Huggan Watson, aged 74 years, at his home, 12, Ings Way, Fairweather Green, Bradford, on September 21st, after a long period of indifferent health.

"Although I had only known Arthur—he was always known as such to his multitude of friends—for a relatively short spell during his 50 years of practice, I learnt much of him and from him.

"After qualifying M.R.C.V.S. in July, 1902, at the Royal Veterinary College, London, he spent some time in general practice at Tadcaster. He later settled in Bradford in the practice established by Mr. Newsome. After service with the R.A.V.C. during the 1914-18 war in France and Egypt, he returned to Bradford to take up the work he loved so well, but in a practice which had dwindled in his absence. He then knew hard times, but because of hard work and a high degree of professional competence and integrity he soon re-established himself. The practice flourished and at the time of his retirement he had two partners trying to keep up the pace he had set in his early days.

"Although his time was so largely occupied with professional matters he still had time to take up farming and he established a pedigree Shorthorn herd. However, this venture was not a great success, probably because pressure of professional duties did not allow him to give it the time required. Another interest, which I was given to understand was much more successful, was breeding and racing trotting ponies.

"All through his career he took a lively interest in the political side of the profession, having represented the Yorkshire Division on the Council of the then N.V.M.A., and he served for many years on the Finance and General Purposes Committee of that Council. He was a Past-President of the 'Yorkshire' and only last year was made an Honorary Associate to celebrate his 50 years' membership. But many people will agree that his greatest service was that which he rendered to the National Veterinary Benevolent and Mutual Defence Society. His colleagues who worked with him in that Society will be better able to tell of the invaluable advice and help given by him. He also served for a number of years as Treasurer of the Society of Practising Veterinary Surgeons.

"His interests outside the profession were many. Mr. Watson was a member of the St. Lawrence Lodge of Freemasons, Pudsey, and also a member of the Rotary Club in Otley. He was a Past-President of the Bradford Musical Union and revelled in the good fellowship which he found in these institutions. There was not an agricultural show in the district that he did not have a big hand in running, and needless to say, for a man of his age and training, his main interest was in the horse. If he took any time off from the practice it was to attend the Yorkshire County Cricket matches. He was a member of the club and a staunch supporter. Arthur was always the blunt Yorkshireman who believed in calling a spade a spade and many of his friends will recall with joy the names he called them, too.

"Under a brusque exterior there lay a very kindly heart and his help where he thought it deserving was never stinted. He was ever jealous of the profession's good name, and in his passing we have lost a very loyal friend whose word was his bond and whose life should be an example to us all—plenty of hard work with perhaps a modicum of hard play.

"Our sympathy goes out to Mrs. Watson, who has suffered her grievous loss so soon after celebrating her golden wedding, and also to his two daughters."

The Funeral

The funeral took place on Thursday, September 24th. After a short private service at the house, a service was held in Trinity Methodist Church, Pudsey, followed by cremation at Lawnswood Crematorium, Leeds. As well as the chief family mourners and friends, the service was attended by a large gathering representing the profession, the Ministry of Agriculture and Fisheries, the

Masons, R.S.P.C.A., the Bradford Musical Union, the Bradford Blighty Club and the Bradford City Police. Amongst those members of the profession present were the Misses Woods and Dalby, Messrs. H. Sumner, J. W. Procter, H. Holroyd, G. W. Donaldson, W. R. McKinna, H. B. Allen, Dr. K. C. Sellers, Messrs. K. G. Towers, D. C. Smith, F. Lofthouse, T. D. Morgan and A. J. Adams.

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The Late Mr. R. E. Lloyd, M.R.C.V.S.

In our issue of last week we recorded with much regret the death of Mr. Richard Edward Lloyd, M.R.C.V.S., who passed away at his home, "Cheriton," Vergam Terrace, Fishguard, on Wednesday, September 16th, after a long period of failing health. The *County Echo* says of him: "The late Mr. Lloyd had resided locally for the past 27 years and was held in high esteem by all who knew him. A veterinary surgeon of much experience and former Divisional Inspector for the Ministry of Agriculture and Fisheries, he retired last February. He was a keen member of the Arts Club and had acted as treasurer of the photographic section of this organisation. He is survived by his wife, to whom sincere sympathy is expressed."

Mr. Richard Lloyd was a brother of Mr. E. C. Lloyd, M.R.C.V.S., until last year Deputy Chief Veterinary Officer, Animal Health Division, and who, as he is now in Yugoslavia with FAO, was unable to attend the funeral. This took place at St. Mary's Church Cemetery in the presence of a representative gathering. The services at the house, church and graveside were conducted by the Rev. Canon D. H. Lloyd, B.A., R.D., vicar. In addition to the principal mourners there were present former members of Mr. Lloyd's clerical staff at Fishguard Harbour; Captain J. J. Kelly, Marine Manager; Mr. F. Fairclough, Surveyor, H.M. Customs and Excise; Mr. W. Manly, Chief Preventive Officer; Captain C. W. Sanderson, O.B.E., and the following members of the profession: Mr. H. G. Lloyd, M.R.C.V.S., Cardigan; Mr. R. J. Thomas, M.R.C.V.S., Haverfordwest; Mr. A. J. S. Reynolds, M.R.C.V.S., and Mr. J. A. Tulloch, M.R.C.V.S., Fishguard.

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UNIVERSITY OF LIVERPOOL DEGREE OF B.V.Sc.

Following is the University of Liverpool, Faculty of Veterinary Science, Examination List, relating to the above degree, for September, 1953:—

First Examination. *Part I.*—Hurst, D. S., Hyams, M.; *Part II.*—Hyams, M.; *Part III.*—Hyams, M.; *Part IV.*—Acker, Joan, Doxey, M. F., Hyams, M., Manning, D. A.

Third Examination. *Part I.*—Butler, Eileen J. M.

Ordinary Degree of B.V.Sc.—Riley, R. M.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax:

Essex.—Hill Farm, Ford End, Great Waltham, Chelmsford (Sept. 30); High Laver Grange Farm, High Laver, Ongar (Oct. 1).

Fowl Pest:

Bucks.—Loves Hill Farm, Loves Hill Lane, Langley, Slough (Sept. 30).

Essex.—New Hall Farm, Hockley; "Shangri-la," Lower Road, Hockley (Sept. 29).

Sussex.—Blackdown Farm, Broad Oak, Heathfield (Oct. 1).

Worcs.—134, Kings Road, Evesham (Sept. 29).

Swine Fever:

Ches.—Baddeley House, Baddeley, Stoke-on-Trent; Park Farm, Styal, Wilmslow, Manchester (Oct. 1).

Essex.—Mertons Farm, Littlebury, Saffron Walden (Oct. 1); Chadwell Hall Farm, Chadwell St. Mary, Grays (Oct. 2).

Flints.—The Piggeries, Pentre, Queensferry, Wrexham (Oct. 2).

Lincs.—Browns Drove, Swinesherd Bridge, Boston (Oct. 1).

Mont.—Frochas Farm, Welshpool (Sept. 30).

Norfolk.—Coronation Farm, Somerton, Gt. Yarmouth (Sept. 30); Mill Farm, Old Brickenham (Oct. 2).

Warwicks.—34, The Parade, Sutton Coldfield, Birmingham (Sept. 30).

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PROCEEDINGS OF THE XVth INTERNATIONAL VETERINARY CONGRESS

The *Proceedings* of the XVth International Veterinary Congress, August 9th to 15th, 1953, can be ordered from the Secretariat of the Congress, c/o Mr. Axel Isaksson, Stockholm 50.

Part I, divided into two volumes, is available now; Part II probably within a couple of months.

Part I contains more than 1,200 pages and includes 261 sectional papers covering all branches of veterinary medicine and food hygiene.

Part II will contain the 10 plenary lectures delivered during the Congress week, the contributions to the discussions after the sectional reports, the bibliographies of the sectional papers, speeches made at the Congress, data concerning elections, resolutions, etc., and the composition of the Permanent Committee for the International Veterinary Congresses and of the National Congress Committees.

The price of the *Proceedings* is Sw. kronor 45, including postage and other expenditure. The sum should, if possible, be sent at the same time as the *Proceedings* are ordered, by cheque direct to the Secretariat of the Congress, c/o Mr. Axel Isaksson, Stockholm 50, or to Intecknings banken AB, Stockholm 16, for account of the Congress.

The Organising Committee of the XVth International Veterinary Congress hope that many colleagues, institutions and libraries will be interested in obtaining the *Proceedings* which give, within a small compass, information on topical problems relating to every aspect of all branches of veterinary medicine and food hygiene.

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MYXOMATOSIS IN RABBITS

While Australia rejoices over the inroads made on her rabbit population by the operation of the myxomatosis virus, a note of concern at the presence of the disease among wild rabbits in Belgium is struck by Dr. Duhaut, Director of Veterinary Services there, who reports to the International Office of Epizootics as follows:—

"The State Laboratory for diagnosis and veterinary research (Dr. Willems, Director) has confirmed the presence of myxomatosis among wild rabbits in Belgium on the territories of the townships of Houthulst, Grimbergen and Mol. In addition, the disease has affected domestic rabbits in the township of Moere, near the French frontier. The infection seems to diffuse slowly. It is not yet possible to estimate the mortality rates. Myxomatosis has been classified among the notifiable diseases and measures of sanitary policy are now applied."

Note from the International Office.—"According to an information not yet confirmed officially, myxomatosis has also penetrated into Germany, affecting wild rabbits notably in the Mannheim area.

"An article on myxomatosis will be published in the number 9-10 of the Bulletin of the International Office of Epizootics. Papers dealing with this subject have been presented by the Director of the Office before the XVth International Veterinary Congress, Stockholm (August 9th to 15th) and also before the VIth International Congress for Microbiology, Rome (September 6th to 12th)."

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The European Regional Committee of the World Health Organisation, at its third session in Copenhagen, recommended that the regional office for Europe should be permanently installed in Geneva, but that the office should be housed outside the Palais des Nations where the world headquarters of WHO are established. For the last two years the European Regional Office has been working temporarily in the Palais des Nations. This recommendation will be submitted for approval to the WHO Executive Board at its meeting in January.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Sheep Scab	Swine Fever
1st to 15th September, 1953	13	—	14	—	99
Corresponding period in—1952	73	8	6	—	28
1951	12	—	4	—	77
1950	7	1	—	1	35
1st January to 15th September, 1953...	490	28	722	—	2,220
Corresponding period in—1952	560	486	157	1	672
1951	311	28	599	4	832
1950	265	20	102	20	128